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(54) Title: **3D VIRTUAL MANUFACTURING PROCESS**

(57) Abstract: A method of is disclosed of checking the feasibility or other properties of a process involving movement and/or assembly of items or components. The method comprises setting up, within a computer, in terms of corresponding sets of data, a virtual three-dimensional space and, in such space, virtual versions of the items or components concerned, represented by corresponding sets of data, and operating a program in the computer so as to manipulate the virtual items or components in that virtual space. The method makes it possible to determine, by operation of the computer, potential difficulties in manipulating corresponding real items or components in real space. The method can be used to set up, within a computer, a virtual factory in virtual manufacturing premises with dimensions corresponding to the real premises available, with virtual machinery with data as to dimensions, to positioning, movement and timing of such machinery, and virtual personnel with corresponding data as to dimensions, limits of safe movement, speed of movement and the like. It is thus readily possible to adjust the data which is variable, and thus represents degrees of freedom, to arrive at an efficient workable arrangement.

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB 02/05219

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G05B19/418

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 G05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LATOMBE J-C ET AL: "Assembly sequencing with tolerated parts" COMPUTER AIDED DESIGN, ELSEVIER PUBLISHERS BV., BARKING, GB, vol. 29, no. 2, 1 February 1997 (1997-02-01), pages 159-174, XP004070878 ISSN: 0010-4485 the whole document	1-3,6
X	US 6 157 902 A (SATO YUICHI ET AL) 5 December 2000 (2000-12-05) abstract column 1, line 1 -column 2, line 36 column 32, line 30-35 --- -/--	1-3,6

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*G\* document member of the same patent family

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 02/05219

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>HSU W ET AL: "FEEDBACK APPROACH TO DESIGN FOR ASSEMBLY BY EVALUATION OF ASSEMBLY PLAN"</p> <p>COMPUTER AIDED DESIGN, ELSEVIER PUBLISHERS BV., BARKING, GB, vol. 25, no. 7, 1 July 1993 (1993-07-01), pages 395-410, XP000385000 ISSN: 0010-4485 the whole document</p>	1-3,6
X	<p>OLIVER J H ET AL: "AUTOMATED PATH PLANNING FOR INTEGRATED ASSEMBLY DESIGN"</p> <p>COMPUTER AIDED DESIGN, ELSEVIER PUBLISHERS BV., BARKING, GB, vol. 26, no. 9, 1 September 1994 (1994-09-01), pages 658-666, XP000468867 ISSN: 0010-4485 the whole document</p>	1,6
X	<p>EP 1 107 082 A (DASSAULT SYS OF AMERICA) 13 June 2001 (2001-06-13) paragraphs '0006!', '0007!', '0023!'-'0025!</p>	4-6
X	<p>LUNDSTROM M ET AL: "A method for assembly system design including an integrated computerized design support"</p> <p>COMPEURO '93. 'COMPUTERS IN DESIGN, MANUFACTURING, AND PRODUCTION', PROCEEDINGS. PRIS-EVRY, FRANCE 24-27 MAY 1993, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 24 May 1993 (1993-05-24), pages 52-61, XP010096086 ISBN: 0-8186-4030-8 the whole document</p>	6
X	<p>ROSSGODERER U ET AL: "A CONCEPT FOR AUTOMATICAL LAYOUT GENERATION"</p> <p>PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION. NAGOYA, JAPAN, MAY 21 - 27, 1995, NEW YORK, IEEE, US, vol. 1, 21 May 1995 (1995-05-21), pages 800-805, XP000657267 ISBN: 0-7803-1966-4</p>	6
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Internal Application No  
PCT/GB 02/05219

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ANDRE G ET AL: "Expert systems applied to scheduling of assembly line" PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON SYSTEMS, MAN AND CYBERNETICS. LE TOUQUET, OCT. 17 - 20, 1993, NEW YORK, IEEE, US, vol. 3, 17 October 1993 (1993-10-17), pages 743-748, XP010132483 ISBN: 0-7803-0911-1	6
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Information on patent family members

International application No

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